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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ZIMMERMAN, GLENN	
ART UNIT	**PAPER NUMBER**
2879	

DATE MAILED: 04/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/640,479	PARK, KYUNG-SU	
	Examiner	Art Unit	
	Glenn Zimmerman	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Amendment, filed on February 10, 2004, has been entered and acknowledged by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4-6, 8-15 and 17 are rejected under 35 U.S.C. 1O3(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view Tatsuda et al. U.S. Patent 4,972,116.

Regarding claim 1, Mera et al. teaches a vacuum (col. 5 line 21) fluorescent display (title) comprising: a pair of substrates (cover plate and base plate Fig. 3 ref. 12 and ref. 11 respectively) an evacuated envelope (vacuum casing Fig. 3 ref. 13)*, An electron emissive (filament cathodes Fig. 3 ref. 22) means for emitting electrons when a negative potential (Fig. 4) is applied, A display means (fluorescent material layer Fig. 3 ref. 19; anode segment ref. 18) provided on one of the substrates in the evacuated envelope for receipt of a positive display, characters, figures and symbol images col. 1 lines 12-15; col. 4 lines 25-30) in response to electrons emitted from the electron emissive means, and an electron control means (mesh shaped

diffusion electrode ref. 28) for generating a repulsive electric field when a negative potential (claim 1; col. 5 lines 46-52: The diffusion electrode is negative with respect to the anode segment so there is a repulsive electric field between the diffusion electrode and the anode segment, which allows acceleration of electrons emitted from the electron emissive means, as the electrons clearly hit the phosphor/anode segments.) is applied thereto to allow acceleration of electrons emitted from the electron emissive means in the direction of the display means.

Wherein the electron emissive means is located between the display means and electron control means (Figs 3 and 4), but fails to teach and side glasses surrounding an evacuated envelope. Tatsuda et al. in the analogous art teaches side glasses (rectangular side plate Fig. 8 ref. 4) surrounding an evacuated envelope. Additionally, Tatsuda et al. teaches incorporation of such a side glass to improve hermetically sealing of the envelope and also provide side walls to allow for depth in the device and a vacuum in the device (col. 1 lines 34-37).

Consequently it would have been obvious to a person having ordinary skill in the ad at the time the invention was made to use side glasses surrounding an evacuated envelope in the evacuated envelope of Mera et al. since such a modification would improve hermetically sealing of the envelope and also provide side walls to allow for depth in the device and a vacuum in the device as taught by Tatsuda et al.

Regarding claim 2, Mera et al. discloses the vacuum fluorescent display as recited in claim 1 , wherein the electron control means is mounted on the substrate (col. 5 lines 4-10).

Regarding claim 4, Mera et al. discloses the vacuum fluorescent display as recited in claim 2, wherein a negative potential is applied to the electron control means (col. 5 lines 14-20 and 45-50). The diffusion electrode ref. 28 is at a negative potential resative to the anode's potential.

Regarding claim 5. Mera et al. discloses the vacuum fluorescent display as recited in claim 1, wherein the electron control means is a plurality of grids which are shaped as a mesh (diffusion electrode net, grid or honeycomb of coarse meshes ref. 28).

Regarding claim 6, Mera et al. discloses the vacuum fluorescent display as recited in claim 1 , wherein the electron control means is a layer of a transparent electrically conductive material (nesa col. 7 lines 2-3).

Regarding claim 8, Mera et al teaches all the limitations of claim 8, but fails to teach a control electrode means, located near the electron electron emissive means, for control of trajectories of electrons emitted from the electron emissive means. Tatsuda et al. in the analogous art teaches a control electrode means (control grid Fig. 8 or 12 ref. 8; shield body and dome-shaped mesh portions Fig. 15 ref. 25 and 24 respectively; col. 2 lines 1-5; col. 8 lines 42-57; col. 7 line 40), located near the electron emissive means, for control of trajectories of electrons emitted from the electron emissive means. Additionally, Tatsuda et al. teaches incorporation of such a control electron means to minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented (col. 4 lines 49-56).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the control grid in the fluorescent display tube of Mera et al and Tatsuda et al. since such a modification would minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented as taught by Tatsuda.

Regarding claim 9, Tatsuda et al. in the analogous art teaches wherein either a positive or negative potential is applied to the control electrode means (col. 2 lines 46-51). The motivation for combination is the same as that in claim 8. The potential is positive relative to the cathode but negative relative to the anode, so both potentials negative and positive work. If the control grid was positive relative to the anode then the device wouldn't work.

Regarding claim 10, Mera et al teaches a method of producing an image (pattern display, characters, figures and symbol images col. 1 lines 12-15) on a vacuum (col. 5 line 21) fluorescent display (title), comprising: providing a vacuum fluorescent display having an evacuated envelop enclosed by two substrates (cover plate and base plate Fig. 3 ref. 12 and 11 respectively), a display means (fluorescent material layer Fig. 3 ref. 10; anode segment ref. 18) provided on one of the substrates in the evacuated envelope, an electron control means (mesh shaped diffusion electrode ref. 28), and an electron emissive means (filament cathodes Fig.3 ref. 22) located between the display means and electron control means, applying a negative potential (Fig. 4) to the electron emissive means to emit electrons, applying

a positive potential (Fig. 4) to the display means to attract the emitted electrons, and applying a negative potential (claim 1: col. 5 lines 46-52; The diffusion electrode is negative with respect to the anode segment so there is a repulsive electric field between the diffusion electrode and the anode segment, which allows acceleration of electrons emitted from the electron emissive means, as the electrons clearly hit the phosphor/anode segments; There also is no mention of current flowing from the cathode to the diffusion electrode but on the contrary from the cathode to the segment anodes col. 5 lines 15-20, so therefore the diffusion electrode repels the emitted electrons.; claim 1 discloses electrons being accelerated toward the anode segments.) to the electron control means to repel and accelerate the emitted electrons toward the display means, but fails to teach side glass. Tatsuda et al. in the analogous art teaches side glasses (rectangular side plate Fig. 8 ref. 4). Additionally, Tatsuda et al. teaches incorporation of such side glasses to improve hermetic sealing of the envelope and also provide side walls to allow for depth in the device for the anode and cathode and to allow a vacuum in the device (col. 1 lines 34-37).

Consequently it would have been obvious to a person having ordinary skill in the ad at the time the invention was made to use side glasses in the envelope of meta et al. since such a modification would improve hermetic sealing of the envelope and also provide side walls to allow for depth in the device for the anode and cathode and to allow a vacuum in the device as taught by Tatsuda et al.

Regarding claim 11, Mera et al. teaches all the limitations of claim 11, but fails to

teach wherein the vacuum fluorescent display further comprises a control electrode, the method further comprising applying a potential to the control electrode to control the trajectory of the emitted electrons. Tatsuda et al. in the analogous art teaches wherein the vacuum fluorescent display further comprises a control electrode, the method further comprising applying a potential to the control electrode to control the trajectory of the emitted electrons (control grid Fig. 8 or 12 ref. 8; shield body and dome-shaped mesh portions Fig. 15 ref. 25 and 24 respectively; col. 2 lines 1-5; col. 8 lines 42-57; col. 7 line 40). Additionally, Tatsuda teaches incorporation of such a control electrode to minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented (col. 4 lines 49-56).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the control electrode/grid in the fluorescent display of Tatsuda et al. since such a modification would to minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented as taught by Tatsuda.

Regarding claim 12, Mera et al. teaches a vacuum (col. 5 line 21) fluorescent display (title) comprising a pair of substrates (cover plate and base plate Fig. 3 ref. 12 and ref. 11 respectively) and an evacuated envelope (vacuum casing Fig. 3 ref. 13),* a display (fluorescent material layer ref. 19; anode segment ref. 18) provided on one of the substrates in the evacuated envelope; an electron controller (mesh shaped

diffusion electrode ref. 28) including a plurality of grids (mesh shaped ref. 18), to allow repulsion and acceleration of electrons toward the display when a negative potential (claim 1; col. 5 lines 46-52; The diffusion electrode is negative with respect to the anode segment so there is a repulsive electric field between the diffusion electrode and the anode segment, which allows acceleration of electrons emitted from the electron emissive means, as the electrons clearly hit the phosphor/anode segments) is applied thereto, and an electron emitter (filament cathodes ref. 22) located between the display and electron controller, but fails to teach side glasses. Tatsuda et al. in the analogous art teaches side glasses (rectangular side plate Fig, 8 ref. 4). Additionally, Tatsuda et al. teaches incorporation of such side glasses to improve hermetic sealing of the envelope and also provide side walls to allow for depth in the device for the anode and cathode and to allow a vacuum in the device (col. 1 lines 34-37).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use side glasses in the envelope of meta et al. since such a modification would improve hermetic sealing of the envelope and also provide side walls to allow for depth in the device for the anode and cathode and to allow a vacuum in the device as taught by Tatsuda et al.

Regarding claim 13, Mera et al. disclose the vacuum fluorescent display as recited in clam 12, wherein the electron controller is mounted on the substrate (col. 5 lines 4-10).

Regarding claim 14, Mera et al. discloses the vacuum fluorescent display as

recited in claim 12 wherein the electron controller is shaped as a mesh (diffusion electrode net, grid or honeycomb of coarse meshes ref. 28).

Regarding claim 15, Mera et al. discloses the vacuum fluorescent display as recited in claim 12, wherein the electron controller is a layer of a transparent electrically conductive material (nesa tin-oxide layer col. 7 lines 2-3).

Regarding claim 17, Mera et al. teaches all the limitations of claim 17, but fails to teach a control electrode located near the electron emitter to control trajectories of emitted electrons. Tatsuda et al. in the analogous ad teaches a control electrode located near the electron emitter to control trajectories of emitted electrons (control grid Fig. 8 or 12 ref. 8; shield body and dome-shaped mesh portions Fig. 15 ref. 25 and 24 respectively; col. 2 lines 1-5; col. 8 lines 42-57; col. 7 line 40). Additionally, Tatsuda et al. teaches incorporation of such a control electron means to minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented (col. 4 lines 49-56).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the control grid in the fluorescent display tube of Mera et al and Tatsuda et al. since such a modification would minimize electrical trouble, reliably prevent pseudo emission due to stray electrons and provide a light source display tube where field emission phenomenon can be prevented as taught by Tatsuda.

Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Mera et al. U.S. Patent 4,122,376 in view Tatsuda et al. U.S. Patent 4,972,1 16 and Ge et al. U.S. Patent 5,859,508.

Regaring claim 7, Mera and Tatsuda teach all the limitations of claim 7, but fail to teach wherein the transparent electrically conductive material is tin doped indium oxide. Ge et al. in the analogous art teaches wherein the transparent electrically conductive material is tin doped indium oxide (col. 20 lines 61-67 and col. 21 lines 1-9). Additionally, Ge et al. teaches incorporation of such a tin dope indium oxide to improve visibility of the EFD (col. 20 lines 61-67 and col. 21 lines 1-9).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use tin doped indium oxide in the diffusion electrode of Mera and Tatsuda since such a modification would improve visibility of the fluorescent display as taught by Ge et al.

Regarding csaim 16, Mera and Tatsuda teach all the limitations of claim 16, but fails to teach wherein the transparent electrically conductive material is tin doped indium oxide. Ge et al. in the analogous ad teaches a transparent electrically conductive material is tin doped indium oxide (col. 20 lines 61-67 and col. 21 lines 1-9). Additionally, Ge et al. teaches incorporation of such a tin dope indium oxide to improve visibidity of the EFD (col. 20 lines 61-67 and col. 21 lines 1-9).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use tin doped indium oxide in the diffusion electrode of Mera and Tatsuda since such a modification would improve visibility of the fluorescent display as taught by Ge et al.

Response to Arguments

Applicant's arguments filed February 10, 2004 have been fully considered but they are not persuasive. The applicant asserts that there is no "repulsive electric field when a negative potential is applied thereto to allow acceleration of electrons emitted from the electron emissive means in the direction of the display". The examiner still notes that the potential on the mesh shaped diffusion electrode ref. 28 is negative with respect to the anode segments and therefore creates an electric field between the mesh shaped diffusion electrode and the segment anodes that repulses the electrodes from the diffusion electrode to the segment anodes as is manifest from col. 5 lines 50-52. The examiner notes that there is no mention of current flowing to the diffusion electrode in Mera et al, but all of the current flows from the cathode to the anode which is indicia of a repulsive electric field that repels and accelerates the emitted electrons toward the display means. If they weren't being repeled by the diffusion electrode then a current would reach the diffusion electrode which a current doesn't go through the diffusion electrode. The examiner notes that there is a negative potential as shown in Figure 4 on the cathodes ref. 22. The examiner notes that the electricification-preventing layers 24 which are connected to the mesh shaped diffusion layers "are provided with a positive bias potential with respect to the cathode potential". This means that the potential on the diffusion electrode can be negative with respect to ground since the cathode is negative. The examiner also notes that the potential placed upon the mesh shaped diffusion electrode is intended use language. One can put more negative

potentials on the mesh shaped diffusion electrode than the cathode if desired for the intended use as Figure 1 of Mera clearly shows this has been done for these types of fluorescent displays in the past yielding working results.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenn Zimmerman whose telephone number is (571) 272-2466. The examiner can normally be reached on M-W 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh D Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Glenn Zimmerman

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